

- Slide 71, 72 "TCP fast retransmit"

- * ال TCP بيست Window من ال Segments
- * مكنتهم كانت، انه بيست ويست ال ACK، كانت بطول ويست وقت
- * ال Socket بيست ال buffer، لا يتلقى يهد الجديد
- * ال مشكلة دي، انه ال Sender يكون على د رايه (عارف) حجم الميجوري عند
- * ال Reciever و حجم ال buffer، فبيستش لا يكون فيك buffer حليات
- *، ا مع 3.75 (ر بفر ال free buffer size)
- * بمعرضه ال window size بقدر تعمل Flow control
- * الباقي غير مقرر؛ انقل على ch. 4 « Network Layer »

- * Network Layer is the actual Layer (Physically) that sends data; it exist in all network components
- * Data in Network layer are called DATAGRAM
- * Network doesn't look at dat encapsulation, it only checks the IP Address
- * Main function is to determine the route between SRC / Dest
- * it checks the IP header to forward the datagram
- * Main functions: routing; forwarding
- * forwarding: transferring data from input interface to output interface; that's why switches are forwarding devices

* Routing: determine the path from SRC to DST

Analogy: forwarding \rightarrow navigating the city

Routing \rightarrow have the path for a trip

* Each router knows the next hub;

So, it has a forwarding table

* Connection Setup: check 4.7

* Remember that TCP do a connection-setup, but that is a logical connection setup; while Network layer does a physical connection setup.

* Transport layer does connection setup between two processes

* Network layer does connection , , two hosts

* Network Layer has IP protocol which is UNRELIABLE

* There are some Reliability;

- it has to send all data
- Delay Guarantee (~~for~~ data sent in a timely manner)
- jitter Guarantee (it has to be small and constant) "Eliminate"

* Jitter; when sending packet P_1, P_2, \dots with delays

T_1, T_2, T_3, \dots with $T_1 \neq T_2 \neq T_3 \neq \dots$

The difference time $T_1 - T_2$; $T_2 - T_3$; \dots

is called JITTER

Jitter التأخير المتغير

- * ال Jitter أنظر ص 11 delay في ال Realtime Applications
- * لجاول يبقى فيه minimize ال delay وال jitter قدر الإمكان
- * الداتا بعتها بترتيبها.

✓ Network layer service model :- 4.9

- For internet architecture → best effort
- * عشان ال Net. layer موجودة في كل مكونات الشبكة ، مش بمل فيها كثير
- عشان أفضل سرعة.

- For ATM architecture → Many service models

it had a reliable network layer

* ATM is replaced by MPLS and GMPLS

~~to~~ * MPLS can act as a router and as a switch
to have the best of both routers and switches.

* Virtual Circuit : when net. layer acted by switches

* datagram network: / / / / routers

Connection VS. connection-less service [4.11]

* Virtual Circuit 4.12

* يتم فيها تحديد مسار من ال SRC ال DST
* كل راوتر في المسار ده بيقرع عارف رقم ال VC

* عشان يعرف ال VC لبيحتاج 3 حاجات [4.13]

* المعلومة في حالة VC بتكون VC number
* dest. IP بتكون datagram connection

check forwarding table 4.14

VC example [4.15]

* DATA GRAM network [4.16]

- * عندی بیکور فید routing table بیکور عاملا ار routing algorithm
- * عیب تغزید کل ار IP فی اینتورک هو ار Processing و ار memory طلبه
- * صلاها فی تقیم ار IP ل Ranges وکل / و تر یعرف جزء مر ار IPs
- * مثال فی [4.18] [4.19]